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Supporting documents are attached to the report as separate files (MS Word, HTM).

14. ABSTRACT

HFM-181 Symposium on Human Performance Enhancement for NATO Military Operations (Science, Technology and Ethics) was held in Sofia, Bulgaria from 5 through 7 October. The Chairs of the meeting were Col. Karl Friedl (USA) and Dr. Pang Shek (CAN). Participants represented a broad range of allied, partnered and affiliated countries presenting on a range of topics in the area of human performance optimization and enhancement. Theoretical possibilities and associated bioethical issues in inducing supra-normal abilities in human performance in NATO military settings were explored. However, all active research programs presented were concerned with optimizing health and performance, weighing operational reality with the need to protect long-term physical and mental well-being. Bioethical boundaries for enhancement technologies were suggested. However, given the judicial complexity of the ethical debate a more pragmatic option of "due diligence" was recommended. That is, to mitigate circumstances that lead to ethical dilemma, a goal of military operational performance research should be to provide commanders with options for "due diligence" in deciding to authorize performance-sustaining or enhancing technologies that risks long-term health and fitness of service members.

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RTO MEETING PROCEEDINGS **MP-HFM-181**

Human Performance Enhancement for NATO Military Operations (Science, Technology and Ethics)

(Amélioration des performances humaines dans les opérations militaires de l'OTAN (Science, Technologie et Éthique))

Papers presented at the RTO Human Factors and Medicine Panel (HFM) Symposium held in Sofia, Bulgaria, on 5-7 October 2009.

Published October 2009

The Research and Technology Organisation (RTO) of NATO

RTO is the single focus in NATO for Defence Research and Technology activities. Its mission is to conduct and promote co-operative research and information exchange. The objective is to support the development and effective use of national defence research and technology and to meet the military needs of the Alliance, to maintain a technological lead, and to provide advice to NATO and national decision makers. The RTO performs its mission with the support of an extensive network of national experts. It also ensures effective co-ordination with other NATO bodies involved in R&T activities.

RTO reports both to the Military Committee of NATO and to the Conference of National Armament Directors. It comprises a Research and Technology Board (RTB) as the highest level of national representation and the Research and Technology Agency (RTA), a dedicated staff with its headquarters in Neuilly, near Paris, France. In order to facilitate contacts with the military users and other NATO activities, a small part of the RTA staff is located in NATO Headquarters in Brussels. The Brussels staff also co-ordinates RTO's co-operation with nations in Middle and Eastern Europe, to which RTO attaches particular importance especially as working together in the field of research is one of the more promising areas of co-operation.

The total spectrum of R&T activities is covered by the following 7 bodies:

- AVT Applied Vehicle Technology Panel
- HFM Human Factors and Medicine Panel
- IST Information Systems Technology Panel
- NMSG NATO Modelling and Simulation Group
- SAS System Analysis and Studies Panel
- SCI Systems Concepts and Integration Panel
- SET Sensors and Electronics Technology Panel

These bodies are made up of national representatives as well as generally recognised 'world class' scientists. They also provide a communication link to military users and other NATO bodies. RTO's scientific and technological work is carried out by Technical Teams, created for specific activities and with a specific duration. Such Technical Teams can organise workshops, symposia, field trials, lecture series and training courses. An important function of these Technical Teams is to ensure the continuity of the expert networks.

RTO builds upon earlier co-operation in defence research and technology as set-up under the Advisory Group for Aerospace Research and Development (AGARD) and the Defence Research Group (DRG). AGARD and the DRG share common roots in that they were both established at the initiative of Dr Theodore von Kármán, a leading aerospace scientist, who early on recognised the importance of scientific support for the Allied Armed Forces. RTO is capitalising on these common roots in order to provide the Alliance and the NATO nations with a strong scientific and technological basis that will guarantee a solid base for the future.

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Human Performance Enhancement for NATO Military Operations (Science, Technology and Ethics)

(RTO-MP-HFM-181)

Executive Summary

The symposium objective was to explore the theoretical possibilities and bioethical issues associated with human performance enhancement and optimization in NATO operations.

The symposium findings were:

- Performance enhancement technology is generally not mature enough for human operational test and experimentation. Performance optimization technology is available and the efficacy and health consequences of such manipulations must continually be evaluated.
- Bioethical deliberations concerning Human Performance Enhancement in military settings are reactive to experimentation. Proactive policies for research and application of enhancement technologies are required.
- Valid potential operational scenarios were not well articulated. Absent these scenarios, conversations about performance enhancement defaulted to science fiction-like scenarios.
- Cooperative research in military medical operational performance is insufficient. Synergies across NATO partners are not exploited. As such, interoperability resulting from collaboration and "buy-in" of best practices in sustaining an international force is not leveraged.
- Researchers appear to have limited understanding of performance requirements of deployed service members and the operational realities of commanders. Research questions were generally not proactive or directly relevant to current or future operations.
- There is limited integration and management of knowledge related to health and performance research. This may be hampering development of NATO-relevant programmatic research.

The symposium recommendations were:

- NATO nations should decide, at a minimum, on bioethical boundaries before medical and materiel performance enhancement technology significantly outpaces policy.
- Health and fitness standards should be separate from performance standards, since health and fitness are foundational to but not predictive of performance.
- A goal of military operational performance research should be to provide commanders with options for "due diligence" in deciding to authorize the use of performance-sustaining or enhancing modalities which risks long-term health and fitness of service members.
- The NATO military medical operational performance research community needs to establish cooperative research programs (e.g., data exchange agreements, joint research) following the model set by those in the engineering and materiel development research communities.
- National and NATO leader development programs for research program directors should be implemented to educate them on current and future operational and strategic threats, environments and associated service member and unit performance expectations.
- NATO should establish a knowledge management program to mine patterns in force health and performance in current and past conflicts and exercises to drive research programs.
- Meeting findings and recommendations are discussed in detail in the full report under corresponding headings detailing recommendations and rationale.

Amélioration des performances humaines dans les opérations militaires de l'OTAN (Science, Technologie et Éthique)

(RTO-MP-HFM-181)

Synthèse

L'objectif du colloque était d'explorer les possibilités théoriques d'amélioration et d'optimisation de la performance humaine, et les problèmes bioéthiques associés, dans les opérations de l'OTAN.

Les résultats du colloque étaient:

- La technologie d'amélioration de la performance n'est généralement pas suffisamment mûre pour des essais opérationnels et une expérimentation sur l'homme. La technologie d'optimisation des performances est disponible et l'efficacité ainsi que les conséquences sur la santé de telles manipulations doivent être continuellement évaluées.
- Les délibérations de bioéthique concernant l'amélioration des performances humaines dans le domaine militaire ont réagi au sujet de l'expérimentation. Des politiques proactives de recherche et d'application des technologies d'amélioration sont nécessaires.
- Les scénarios opérationnels potentiels valides n'étaient pas bien articulés. Absentes de ces scénarios, les conversations concernant l'amélioration de la performance ont fait défaut à des scénarios relevant de la science-fiction.
- La recherche en coopération concernant la performance opérationnelle militaire du point de vue médical est insuffisante. Les synergies entre tous les partenaires de l'OTAN ne sont pas exploitées. En tant que telle, l'interopérabilité résultant de la collaboration et de « l'achat » des meilleures pratiques pour le soutien d'une force internationale, n'est pas appuyée.
- Les chercheurs semblent avoir une compréhension limitée des exigences de performance du personnel déployé et des réalités opérationnelles des commandants. Les questions de recherche n'étaient généralement pas proactives et ne correspondaient pas directement aux opérations actuelles ou futures.
- Les connaissances relatives à la recherche en matière de santé et de performance sont peu intégrées et mal gérées. Ceci peut entraver le développement de la recherche programmée concernant l'OTAN.

Les recommandations du colloque étaient:

- Les nations de l'OTAN devraient établir, au minimum, des frontières bioéthiques avant que la technologie d'amélioration de la performance matérielle et médicale ne dépasse la politique.
- Les normes de santé et de forme physique devraient être séparées des normes de performance, puisque la santé et la forme physique sont fondamentales mais ne sont pas prédictives de la performance.
- Un objectif de la recherche de performance opérationnelle militaire devrait être de fournir aux commandants des options pour décider « en toute connaissance » d'autoriser l'emploi de modalités de soutien ou d'amélioration de la performance qui comportent des risques sur le long terme pour la santé et la forme physique du personnel.
- La communauté médicale militaire de recherches sur les performances opérationnelles de l'OTAN doit établir des programmes de recherche coopératifs (par exemple, accord d'échange de données, recherche commune) en suivant un modèle similaire à ceux des communautés de recherche technologique et de développement des matériels.
- Des programmes phares de développement, nationaux et OTAN, destinés aux directeurs de programme de recherche, devraient être mis en œuvre pour les informer des menaces opérationnelles et stratégiques actuelles et futures, de l'environnement et des attentes du personnel et des unités, en matière de performances.
- L'OTAN devrait établir un programme de gestion des connaissances exploitant les schémas en vigueur concernant la santé et la performance dans les conflits actuels et passés et dans les exercices afin d'orienter les programmes de recherche.
- Le compte rendu complet présente par rubriques et en détail les conclusions du colloque, ses recommandations et les raisons qui les motivent.

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